

Appl. No. 10/709,205
Amdt. Dated 09/22/2006
Reply to Office action of June 23, 2006

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SEP 22 2006

REMARKS/ARGUMENTS

This is in response to an Office action dated June 23, 2006 having a statutory period of response set to expire on September 23, 2006.

The specification was objected to because the title of the invention is not descriptive. The specification has been amended to give a new title **METHOD OF PERFORMING LATCH UP CHECK ON AN INTEGRATED CIRCUIT DESIGN** which is clearly indicative of the invention to which the claims are directed.

Claims 2-15 and 18-20 are objected to because of the following informalities: there is insufficient antecedent basis for these claims. First "A method" has to be replaced by -The method--

In claims 2-15, "A method" has to be replaced by -The method--.

In claims 18-20 "A Computer" has been changed to "The computer program product"

In claim 4 line 2, a space has been inserted after "of".

In claim 4 "a cell" has been amended to read --the cell--.

Claim 20 has been amended to depend upon claim 18 and the cell is now defined as "a cell in the byte array" to provide sufficient antecedent basis for the cell being "a cell" of the "cells in a byte array" of claim 18.

In claim 11, line 6, --code- has been inserted after "fifth".

In claim 14, "UNREACHABLE" has been amended to read --unreachable--.

Appropriate corrections have been made.

Claims 1-13 were rejected under 35 U.S.C. 103(a) as being unpatentable over Bhat et al. ("Special Purpose Architecture for Accelerating Bitmap DRC", 25-29 June 1989, Design

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Automation, 26th Conference on, Pages:674 — 677) in view of Bell (US Patent 6,615,393).

Applicant respectively asserts that Bhat does not teach or suggest checking for latch-up. The present invention as claimed in claim 1 is directed to "method of performing latch up check on an integrated circuit (IC) design."

In addition Bhat does not teach or suggest determining reachability or distance within a polygon. The present invention as claimed in claim 1 includes "computing a combined least enclosing rectangle enclosing a conductor region shape and contact shapes."

Further Bhat does not teach or suggest, iterative expansion within a grid of pixels.

The present invention as claimed in claim 1 includes "iteratively expanding the contact shapes within the conductor region shape using a cellular algorithm."

Still further Bhat does not teach or suggest, generating shapes representing an unreachable area.

The present invention as claimed in claim 1 includes "generating shapes representing an unreachable area of the conductor region shape."

Bell does not overcome the differences between Bhat and the present invention. Instead Bell teaches a minor improvement to the prior art described in our application. This prior art, which is well known, involves using iterative expansion of seed shapes within vector-defined polygons to determine reachability. Bell's improvement is to reduce runtime by recognizing and eliminating smaller shapes as they become completely covered by the expanded seed shapes. This improvement is unnecessary in our cellular approach, because when a shape becomes completely filled by the expanding seed cells, no new cells within that shape will be available to add to the frontier list. Thus Bell, which does not teach or suggest "checking the shapes representing the unreachable area of the conductor region shape against junction shapes in the design, and reporting to a designer any junction shapes which intersect the unreachable area as errors." Accordingly, claim 1 should be deemed allowable.

The present invention as defined in claim 3 includes "periodically skipping expanding corner cells of the contact shapes." This step is important to the present invention because it improves accuracy by creating a more circular expansion of the seed shapes, as opposed to a strictly rectilinear expansion. Bhat does not teach the step of periodically skipping expansion of corner

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cells. Bhat is different in that it teaches if the geometry being processed was larger than the maximum window size supported, then multiple overlapping windows could be employed. Any cell in the area of overlap could therefore be processed up to four times, whereas cells lying inside of a single window need only be processed once.

Accordingly, claim 3 should be deemed allowable.

Claims 14 and 15 were objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. They have been rewritten in independent form including all of the limitations of the base claim and any intervening claims and are therefore allowable.

Claims 16, 17 are allowed.

Claims 18-20 being dependent from allowed claim 17 are allowable because amendments have been made to overcome the objection of claims 18-20.

New claim 21 includes the features of extracting unreachable areas of the conductor region shape by traversing the byte array, row-by-row, detecting horizontal chains of unreachable cells, converting each chain into a rectangle by converting its corners into (X,Y) coordinate pairs representing positions in an original drawing space, and computing the union of these rectangles, and returning these shapes as the unreachable area of the conductor region as claimed. Accordingly, claim 21 should be deemed allowable.

Claim 1 sets forth the features of present invention including; a method of performing latch up check on an integrated circuit (IC) design; computing a combined least enclosing rectangle enclosing a conductor region shape and contact shapes; iteratively expanding the contact shapes within the conductor region shape using a cellular algorithm; and generating shapes representing an unreachable area of the conductor region shape. Since none of the references taken alone or in combination teach or suggest this combination of features for the reasons set forth hereinbefore, claim 1 should be deemed allowable.

Claims 2-13 depend upon claim 1 and should be deemed allowable.

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Independent Claim 14 was objected to and has been rewritten in independent form and is therefore allowable.

Claim 15 depends upon claim 14 and is also allowable.

Claim 16 was indicated as being allowable.

Claims 17-20 depends upon claim 16 and are also allowable.

Newly submitted independent Claim 21 includes the allowable features and should also be allowable.

Conclusion

Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,



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